U.S. Robotics®

Additions and Corrections

Courier HST Dual Standard, Courier HST and Courier V.32 Modems

NEW FEATURES! INCLUDING—
V.42 AND V.42BIS COMPATIBILITY
STORAGE OF THE LAST-DIALED NUMBER

Additions and corrections in this supplement include the page or pages of the manual where the feature is fully described. If there is no page number reference, the enhancement is entirely new.

Not all of the information given here may be included in the summaries on the modem case bottom label.

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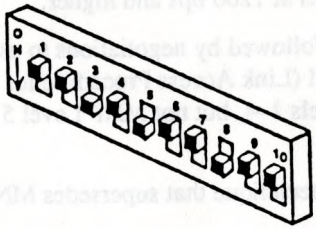
FACTORY SETTINGS, DIP SWITCHES



We've changed the DIP switch defaults for switches 1, 6 and 9. The modem is shipped with these switches UP, as shown in the diagram. The results are as follows. Check your software requirements.

1 Data Terminal Ready signaling Normal: the modem requires DTR from the computer in order to accept commands; dropping DTR terminates a call. The DOWN position enables the DTR override.

6 Carrier Detect signaling Normal: the modem sends CD when it connects with another modem and drops CD when it loses carrier, usually because one of the modems disconnects. The DOWN position enables the CD override.

9 The modem hangs up when you send it the +++ escape code, returns to Command mode and sends the NO CARRIER result code. When DIP switch 9 is DOWN, the modem returns to Command mode, sends the OK result code, and maintains the connection. You can then send it commands and toggle it back online, or you can send it the hang-up command, ATH.

&C AND &D COMMANDS

The following functions have been added to the command set. These commands override DIP switches 6 and 1, described above, for your current session, unless you change the setting again. At power-on and reset, the modem operates in accordance with the DIP switches.

&Cn Carrier Detect, CD (DIP switch 6)

- &C0 CD Override (always ON)
- &C1 CD Normal

&D Data Terminal Ready, DTR (DIP switch 1)

- &D0 DTR Override (always ON)
- &D1 Reserved
- &D2 DTR Normal

NEW! V.42 AND V.42BIS COMPATIBILITY

Courier High Speed modems now comply with the following CCITT recommendations for connections at 1200 bps and higher.

V.42: a Detection sequence followed by negotiations to use an error control protocol called LAPM (Link Access Procedure for Modems). V.42 also includes MNP Levels 1–4, but not MNP Level 5 compression.

V.42*bis*: a data compression technique that supersedes MNP Level 5 compression.

The following commands and options are affected by this change.

&M Error Control, page 4-5. Use the guidelines in the manual. The only changes are in the following negotiation sequences.

The modem first attempts the V.42 Detection phase. If it detects a remote V.42 modem set for error control, it proceeds to LAPM handshaking. If the remote modem is not a V.42 modem, the Courier tries for an MNP connection. If the remote modem is not set for error control, the Courier either continues in Normal mode (&M4) or hangs up (&M5).

Note that the above procedures do not apply to HST-mode Courier modems operating at high speeds (above 2400 bps). Modems in HST mode always attempt an HST connection with V.42*bis* compression. If the remote modem does not conform to V.42*bis*, the Courier tries for an HST connection with MNP Level 5 compression.

&K3 Data Compression, page 4-6. This new setting disables MNP data compression, but not MNP error correction. It is for users who are transferring files that are already compressed, such as the .ARC files downloaded from many bulletin boards.

MNP Level 5 compression causes files that are already compressed to accrue additional data, which lowers throughput. (See guideline 2 on page 4-4 of the manual.) V.42*bis* compression, on the other hand, efficiently handles files that are already compressed. Setting the modem to &K3 allows a V.42 connection with compression or an MNP connection without compression.

S27	Bit 4	Bit 5	Result
	0	0	Complete handshaking sequence: V.42 Detection, LAPM error control, MNP
	16	0	Disable MNP
	0	32	Disable V42 Detection and LAPM
	16	32	Disable Detection phase, if you know that the remote modem does LAPM, but not the Detection phase

ATI6 Page 8-2. This command causes the modem to display Link Diagnostics information about the last call. The display now includes the call's last rate, the protocol for the call (HST, LAPM, MNP, SYNC or NONE), and the type of compression, if used (V.42*bis* or MNP5). If the modem reports V.42*bis* compression, it also reports the size of the compression dictionary and the maximum length of the entry strings, for example, "2048/32."

USRobotics modems use a 2048-entry (11-bit) dictionary, but will drop down to match modems which use 1024-entry (10-bit) or 512-entry (9-bit) dictionaries. The Courier's maximum entry string size is 32 characters.

REDIALING

The information in this section is in addition to the redialing options covered in the manual, beginning on page 6-6. A new redial buffer stores each Dial command until you send a new Dial command. To have the modem redial the last dialed number, use the following command:

ATDL <Enter>

The modem displays the number in the redial buffer when you send it either of the following:

ATDL? <Enter> or ATI4 <Enter>

If you want to power off the modem or reset it, and want to save the last dialed number, write it to nonvolatile memory (page 5-3). Select one of the four positions, 0-3, at which to store the number and substitute "L" for the dial string:

AT&Z2 = L <Enter>

If there is a number already stored at the specified position, the modem overwrites it with the last-dialed number.

&A, ADVANCED RESULT CODE OPTIONS

The &A0 and &A1 options are described on pages 5-5 and C-7 of the manual. &A0 disables any information except the normal CONNECT result code. If set to &A1, the modem adds an /ARQ suffix (Automatic Retransmit Request) if the call is under error control, for example, CONNECT 2400/ARQ. Additional options are now available, as follows.

&A2 At this setting, the modem reports the high-speed modulation for the call, HST or V.32. This is useful to operators of Courier Dual Standard modems who want to know the modulation used for each call.

23/CONNECT 9600/HST	33/CONNECT 9600/V.32
27/CONNECT 9600/ARQ/HST	37/CONNECT 9600/ARQ/V.32
28/CONNECT 4800/HST	38/CONNECT 4800/V.32
29/CONNECT 4800/ARQ/HST	39/CONNECT 4800/ARQ/V.32

The &A2 option is not useful to owners of Courier HST or Courier V.32 modems, because these modems always report the same modulation, HST or V.32, respectively. Modulation is not reported for calls at 2400, 1200 or 300 bps.

&A3 At this setting, the modem reports the protocol of the call. Error control protocols reported are: HST, LAPM, or MNP. When the call is not under one of those protocols (and ARQ is not included in the result code), the modem reports either SYNC, indicating a synchronous connection, or NONE, for no protocol.

If the modems negotiated for data compression, the type of compression, V42BIS or MNP5, is added to the result code. In the first of the following examples, the modems negotiated error control for the call (ARQ), used HST modulation, used the HST error control protocol, and used V.42*bis* compression.

```
CONNECT 9600/ARQ/HST/HST/V42BIS  [or MNP5]
CONNECT 9600/ARQ/V32/LAPM/V42BIS [or MNP/MNP5]
CONNECT 9600/SYNC
CONNECT 2400/ARQ/MNP/MNP5        [or LAPM/V42BIS]
CONNECT 2400/NONE
```

SYNCHRONOUS OPERATIONS

&M3 Pages 7-5, C-8. The &M3 option of continuous synchronous operation has been removed. To operate in synchronous mode, follow the directions in Chapter 7, but disregard references to &M3 or Continuous Synchronous Mode.

S26 Page 7-2. The manual does not state that the modem's Request to Send/Clear to Send (RTS/CTS) delay only works once a

synchronous connection is established. This will not cause any problems with your synchroncus hardware or software.

Setting the Modulation and Link Rate, page 7-5.

Use the following guidelines to connect synchronously with the specified type of remote modem. You may also want to review Chapter 3 and/or Appendix E-3 in the manual for additional information on modulation and link negotiation.

1. *Remote USRobotics modem, HST mode:* Courier HST modems are always set to B1 unless they are answering international calls, for which they are set to B0. Set answering Dual Standard modems to B1; set calling Dual Standard modems to either B1 or B0. For a 9600 bps connection, set both modems to a fixed link rate, &N6. For a 2400 bps connection, set both modems to a variable link rate, &N0.

2. *Remote USRobotics modem, V.32 mode:* Courier V.32 modems are always set to B0. Set answering Dual Standard modems to B0; set calling Dual Standard modems to either B1 or B0. Set both modems to a variable link rate, &N0. The modems will connect at the highest possible rate.

3. *Remote Non-USRobotics V.32-compatible modems:* Set the Courier to V.32 mode, B0. Try a variable link rate, &N0, first. If that doesn't work, try a fixed link rate, &N6 (9600 bps). If after several tries you still do not succeed, you may have to make a slower-rate connection by setting your software to 2400 bps and fixing the Courier's link rate by setting it to &N3 (2400 bps).

LEASED LINE OPERATIONS—CORRECTIONS. PAGE E-4.2.

NOTE: Operating the modems on a four-wire leased line requires the use of 4-wire to 2-wire converters. These are usually available from the Telephone Company.

One modem needs to be in Originate mode, the other in Answer mode. Set DIP switch 5 on Originate modems DOWN to disable Answer mode, and set DIP switch 5 UP on Answer modems to enable Auto Answer.

In addition, set-up procedures differ if the modems are to operate in Dumb or Smart mode, as explained on the next page.

Dumb Mode

1. Set your communications software to the desired rate, e.g., 9600 bps. Power on the modems with DIP switch 8 DOWN for Smart mode.

2. Send the modems the command AT&L1&W <Enter>. &L1 forces the modems off hook at power on and enables them to re-establish their connection should it be broken. &W writes &L1 to nonvolatile memory (NRAM).

3. Set the modems to load NRAM settings at power on, DIP switch 10 UP, to Dumb mode, DIP switch 8 UP, and to either Originate or Answer mode, DIP switch 5 DOWN or UP, respectively. Then power off and power on the modems. The modems initiate the new DIP switch settings and establish the connection.

Smart Mode

1. The quickest way to configure the modems and get them operating is to write their defaults to nonvolatile memory (NRAM) and have them go off hook in either Originate or Answer mode, as in the following example. Set DIP switch 5 DOWN on the Originate modem, UP on the Answer modem; set DIP switches 8 and 10 UP, for Smart mode and for NRAM defaults.

2. Power on the modems and send each one the following command.

   AT &L1 &S2 [...other NRAM defaults...] &W D [or A] <Enter>

   &L1 enables the modems to connect without dialing (&L1). &S2 causes the modems to send a Clear to Send signal only after they send the Carrier Detect signal. (This feature prevents the modems, if they are trying to reconnect, from misinterpreting an accidental key stroke as the command (any key) to abort the connect sequence and hang up.

   &W instructs the modem to write all of the settings to NRAM. The D or A forces each modem off hook in either Originate (D) or Answer (A) mode.

DUAL STANDARD HANDSHAKING, B1 SETTING.

Page E-3.3. The manual does not mention that a Dual Standard modem set to B1, in Originate mode, switches to V.32 modulation in response to all answering V.32 modems except a Dual Standard modem. An answer-

ing Dual Standard modem, as stated in the manual, switches to HST modulation.

LINK DIAGNOSTICS SCREEN (AT16)—EXPLANATION OF TERMS

Pages 8-2–8-3.

- Chars sent and Octets sent—For calls under data compression, the number of characters sent may be less than the number of octets sent, due to buffering operations.
- Line Reversals—This only applies to HST-mode operations, when the modems switch the high and low speed channels.
- Speed—A new term that shows the last rate at which the modems were connected.

REMOTE DIGITAL LOOPBACK (RDL)

1. Pages F-3.1, F-3.2. The procedures beginning on page F-3.1 are for initiating an RDL test. Follow Steps 1-4. Disregard Step 5 as stated in the manual. To terminate the test, first send the modem the escape code (+++) to bring it back to Command mode. When you receive the OK result code, do either of the following.

   To remain online: first disable RDL testing (ATS16=0). If you wish, issue additional commands, ending with the O command that returns the modem online. Keep in mind, however, that if you want the remainder of the call to be under error control, you must first hang up the modem. &M settings cannot be changed during a connection.

   To terminate the call: first hang up the modem (ATH). Then reset S16 to data mode (S16=0) and optionally reset the modem to error control (&M4) as in the following example.

   ATH S16=0 &M4 <Enter>

2. To respond to another modem's RDL request, set the modem to RDL test mode (ATS16=8). When the remote modem calls and sends an RDL request, your modem's transmitter and receiver are used in the remote user's test. (You will not be able to use your modem until the remote user ends the test.)

&S2 AND &S3—ADDITIONAL DATA SET READY (DSR) SETTINGS

These additions are for specialized installations, for example, those with automatic callback units. Page 4-13, C-9.

&S2 On loss of carrier, the modem sends a pulsed DSR signal with Clear to Send (CTS) following Carrier Detect (CD).

&S3 This is the same as &S2, but without CTS following CD.

SETTING BIT-MAPPED S-REGISTERS

Pages B-5.2–B-5.4. Instead of checking and adding the values of each bit in a register, this command allows you to turn one or more bits ON (1) or OFF (0). The format is ATS*r*.*b* = *n*, where *r* is the register, .*b* is the bit (0-7), and *n* is 0 (OFF) or 1 (ON). For example, ATS13.2=1 turns on bit 2 of register S13. The example ATS13.2=1 .3=1 .6=0 turns bits 2 and 3 on and turns bit 6 off.

CHANGES TO S-REGISTERS

S13 Additional bit-mapped function. Page B-5.2.

Bit 5 (S13=32) disables HST modulation. This is used only for testing V.32 modulation in Dual Standard modems.

S24 Page B-5.4. This register stores the duration of pulsed DSR, a customized function selected with the &S command. The duration is measured in 20-millisecond units, with a default S24 value of 150, for a total of 3 seconds.

S27 Additional bit-mapped functions. Page B-5.4.

- Bit 0, as stated in the manual, is used to select Bell or V.21 mode at 300 bps. To enable V.21 mode, type AT S27=1.
- Bit 1 (S27=2) enables unencoded (non-trellis-coded) modulation in V.32 mode. This option is part of the CCITT V.32 recommendation, but is rarely used.
- Bit 2 (S27=4) disables V.32 modulation. This is used only for testing HST modulation in Dual Standard modems.
- Bits 4 and 5 are described on page 5 of this addendum; bits 6 and 7 are described on the next page.

S28=0 Pages 4-2, 6-10–6-11, B-5, E-3.1–E-3.2. The manual incorrectly states that setting register S28 to 0 disables V.32 modulation. S28=0 eliminates only the 3000/600 Hz answer tones (p. E-3.3), for a shorter V.32 connect time.

SHIFTING VARIABLE AND FIXED DATA RATES

NOTE: The material that follows is intended for those who write their own software, specifically operators of electronic bulletin boards (BBS's). Using standard software and setting the modem for either of the following options could result in loss of data.

The first of the options allows a fixed higher rate for for high-speed calls and variable rates for calls at 2400 bps and below. The second option allows a fixed higher rate for calls under error control and variable rates for calls without error control. Both options apply only to Answer mode and require a setting of &A1 or higher.

S27 Bits 6 and 7 of S27 can be used to fix a high DTE rate for high-speed calls and variable rates for slower calls, even though the modem is set to &B0. Bit 7 enables the speed shift and bit 6 selects the DTE rate. The modem acts on these settings only for error controlled connections at 9600 bps or higher. (Requires X1 or higher.)

Bit	Value	Result
6	0	DTE rate shifts up to 19.2K bps when bit 7 is ON
	64	DTE rate shifts up to 38.4K bps when bit 7 is ON
7	128	Enable DTE rate speed shift for a high-speed ARQ connection if the modem is set to &B0

&B2 On receipt of an ARQ result code, indicating error control, the modem checks the rate stored in NRAM and shifts its DTE rate to the specified high speed. The software, on detecting the result code, also switches its rate upward. To implement &B2, set your software to the desired high fixed DTE rate—9600, 19.2K or 38.4K bps—and then send the modem the command AT&B2&W, to store the rate in NRAM.

TEST PATTERN AT 300 BPS

Pages F-2.3, F-4.1. To use the test pattern for analog loopback or by itself at 300 bps, set your software to 300 bps, and set the modem to fixed DTE and link rates, that is, to &B0 and &N1.